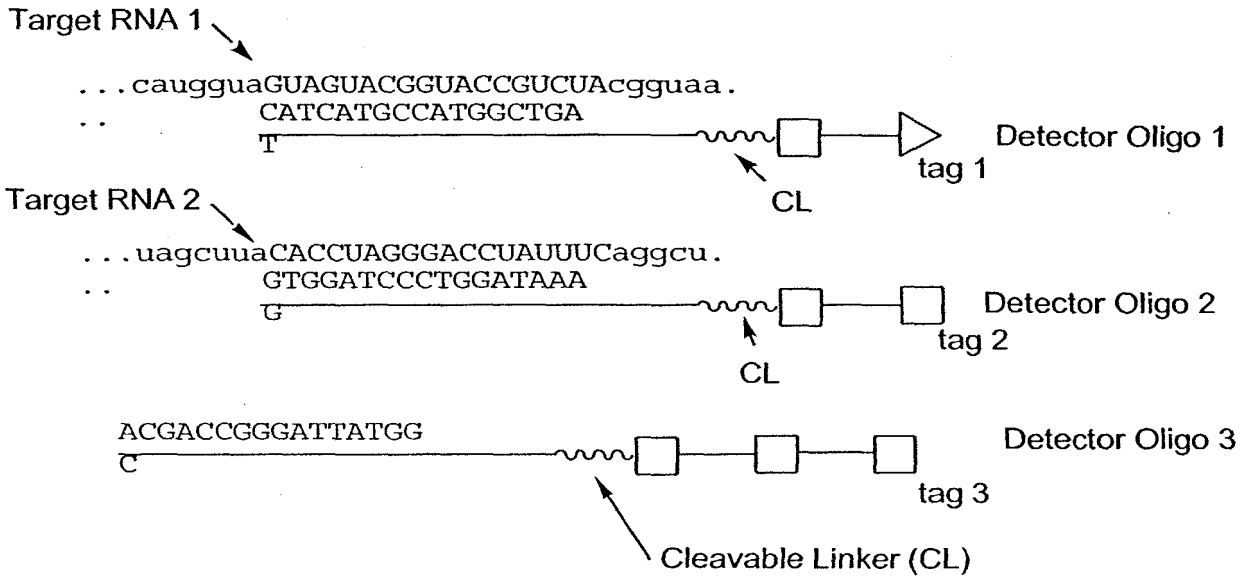


FIGURE 1

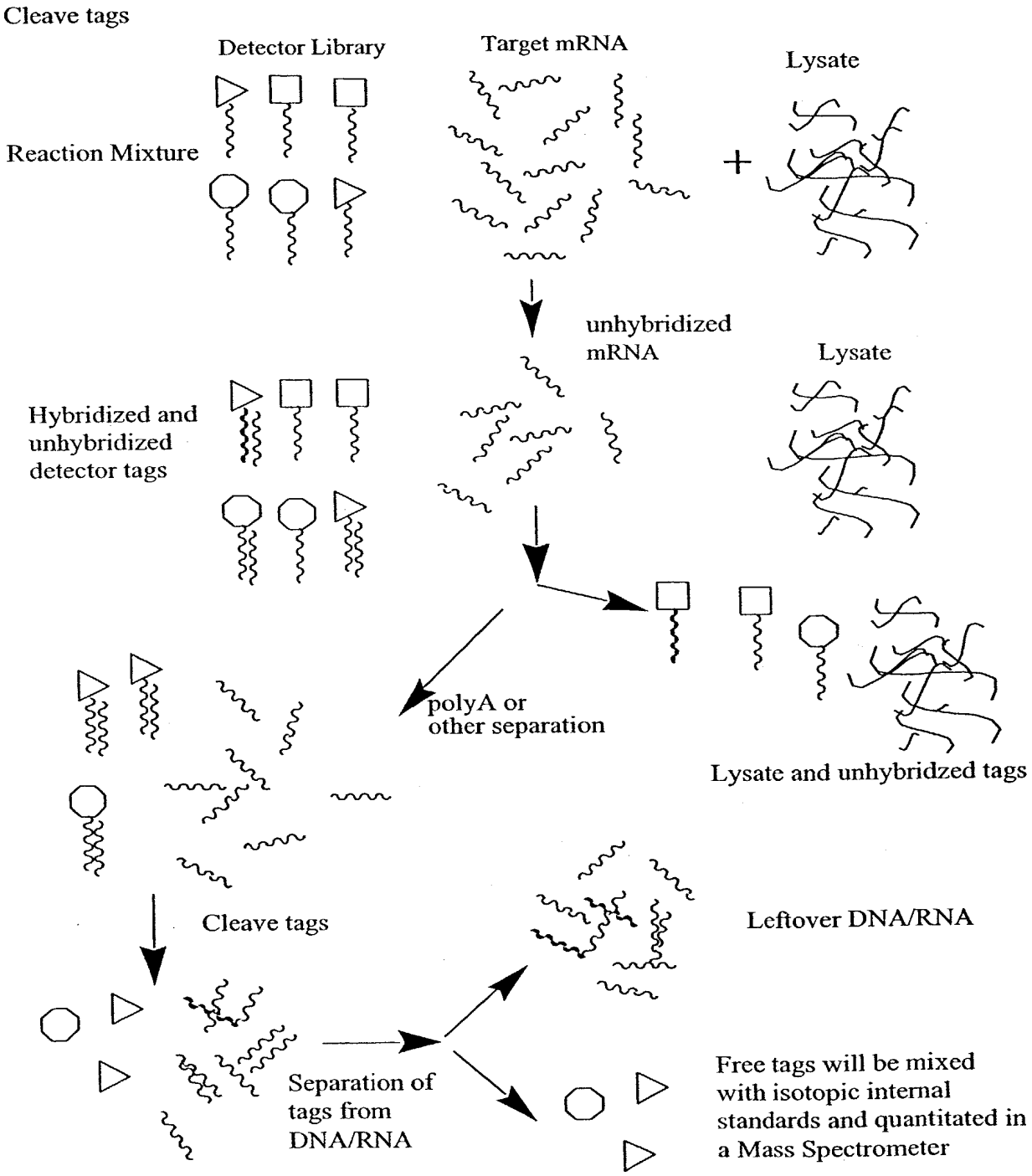

Cleave tags
Detector Library
Target mRNA
Lysate
Reaction Mixture
unhybridized
mRNA
Lysate
Hybridized and
unhybridized
detector tags
polyA or
other separation
Lysate and unhybridzed tags
Cleave tags
Leftover DNA/RNA
Separation of
tags from
DNA/RNA
Free tags will be mixed
with isotopic internal
standards and quantitated in
a Mass Spectrometer

FIGURE 2

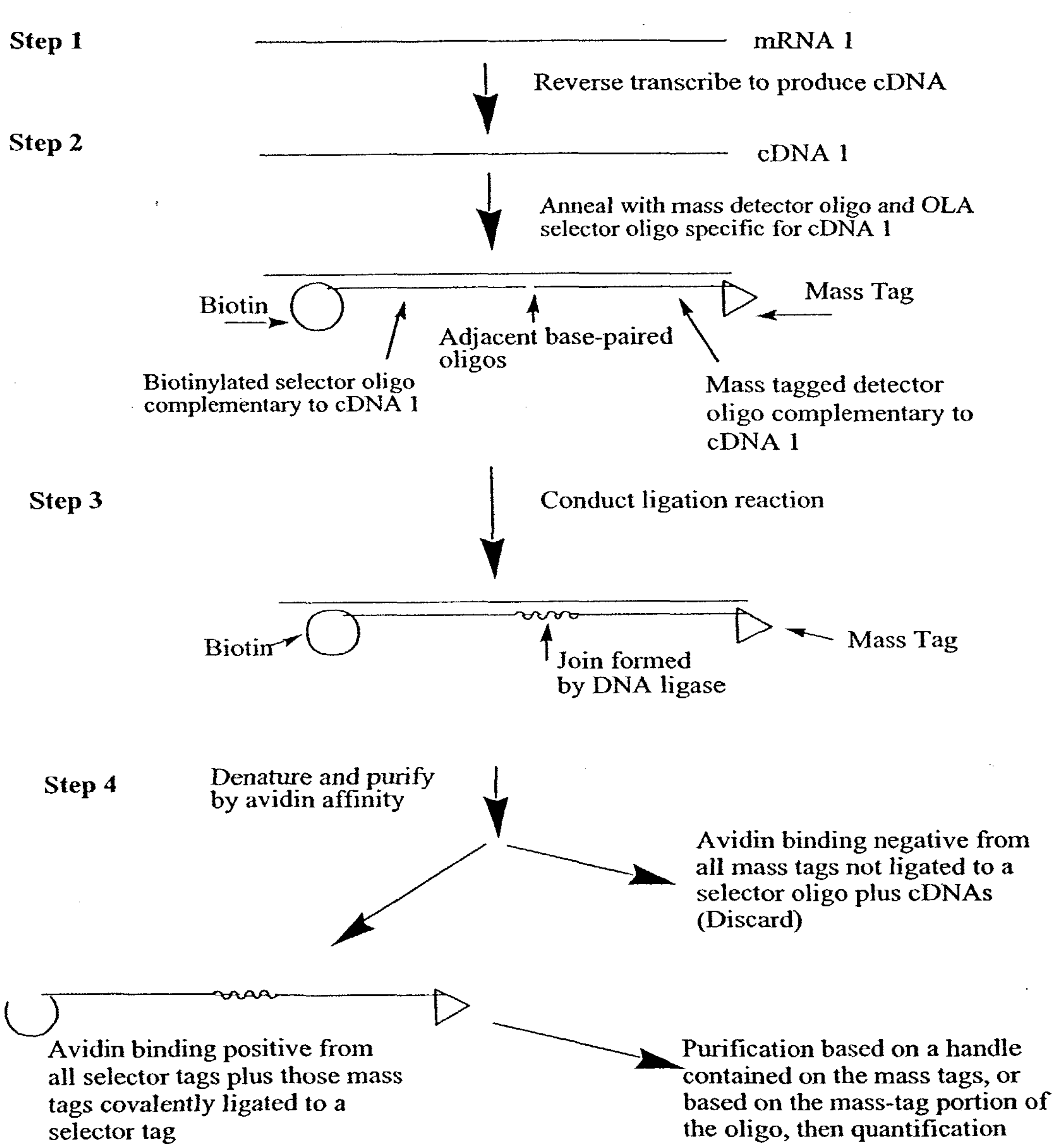

Step 1
mRNA 1
Reverse transcribe to produce cDNA
Step 2
cDNA 1
Anneal with mass detector oligo and OLA selector oligo specific for cDNA 1
Biotin
Mass Tag
Adjacent base-paired oligos
Biotinylated selector oligo complementary to cDNA 1
Mass tagged detector oligo complementary to cDNA 1
Step 3
Conduct ligation reaction
Biotin
Mass Tag
Join formed by DNA ligase
Step 4
Denature and purify by avidin affinity
Avidin binding negative from all mass tags not ligated to a selector oligo plus cDNAs (Discard)
Avidin binding positive from all selector tags plus those mass tags covalently ligated to a selector tag
Purification based on a handle contained on the mass tags, or based on the mass-tag portion of the oligo, then quantification

FIGURE 3

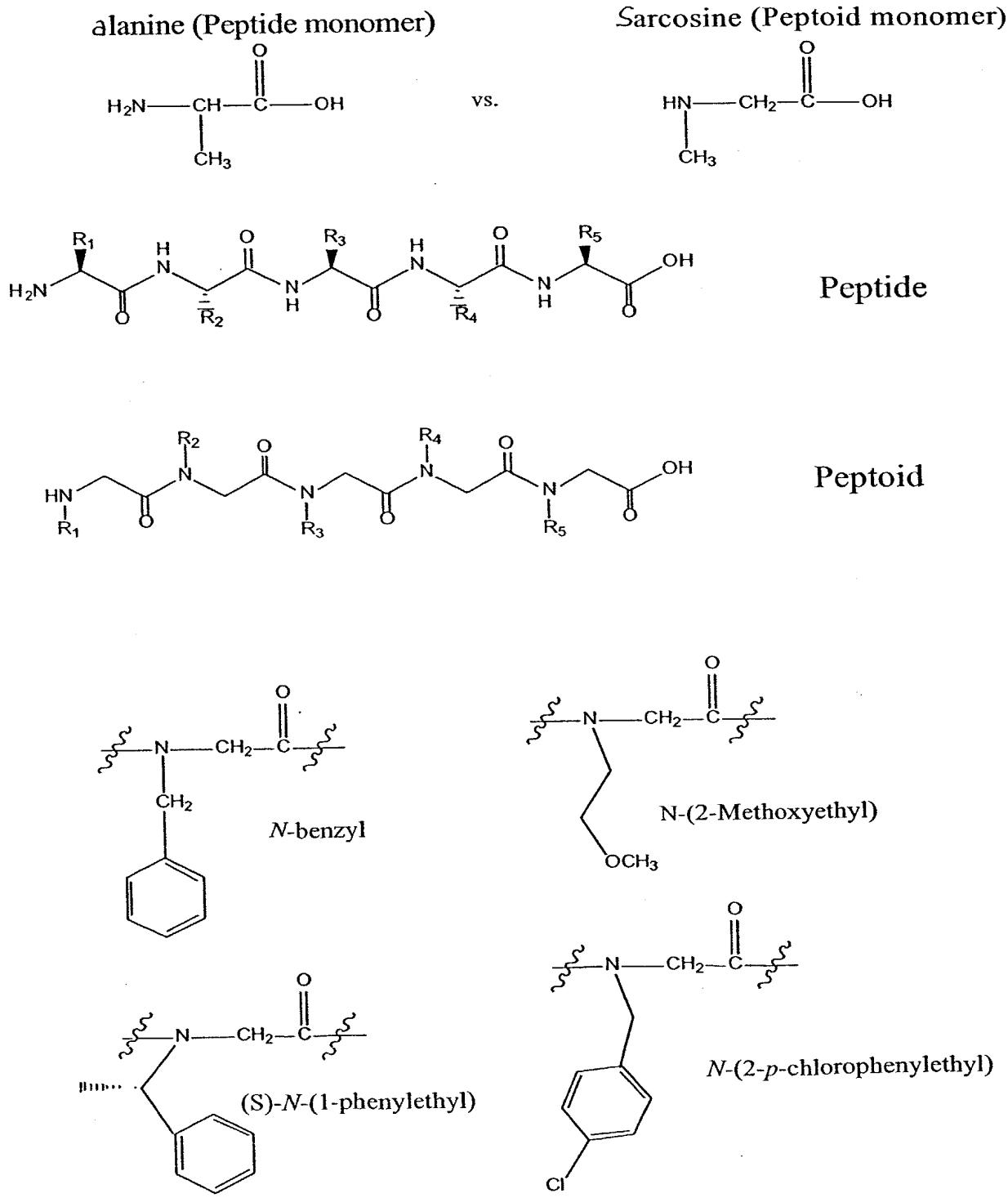

alanine (Peptide monomer)
Sarcosine (Peptoid monomer)
vs.
Peptide
Peptoid
N-(2-Methoxyethyl)
N-benzyl
(S)-N-(1-phenylethyl)
N-(2-p-chlorophenylethyl)

FIGURE 4

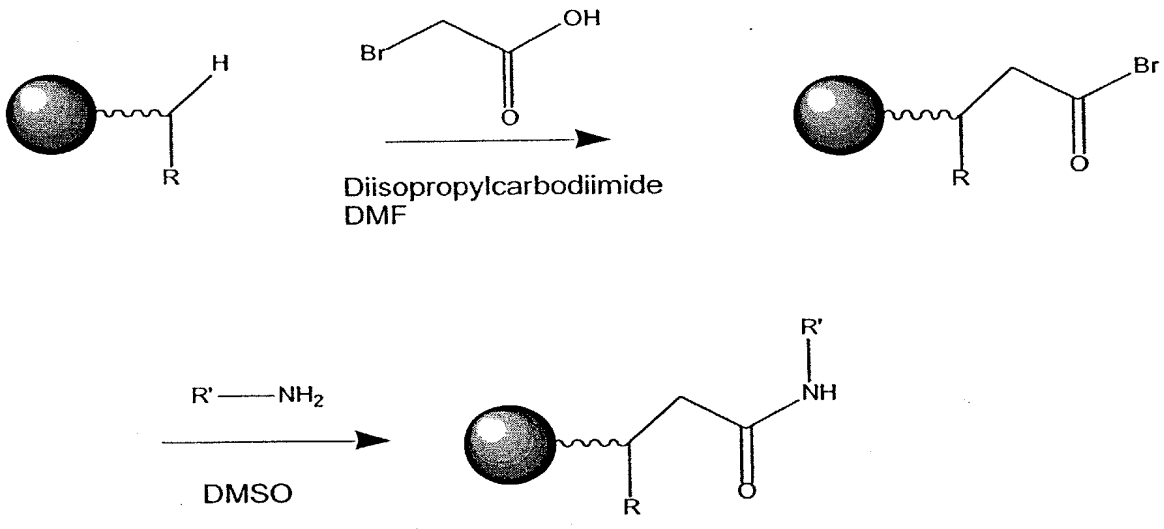
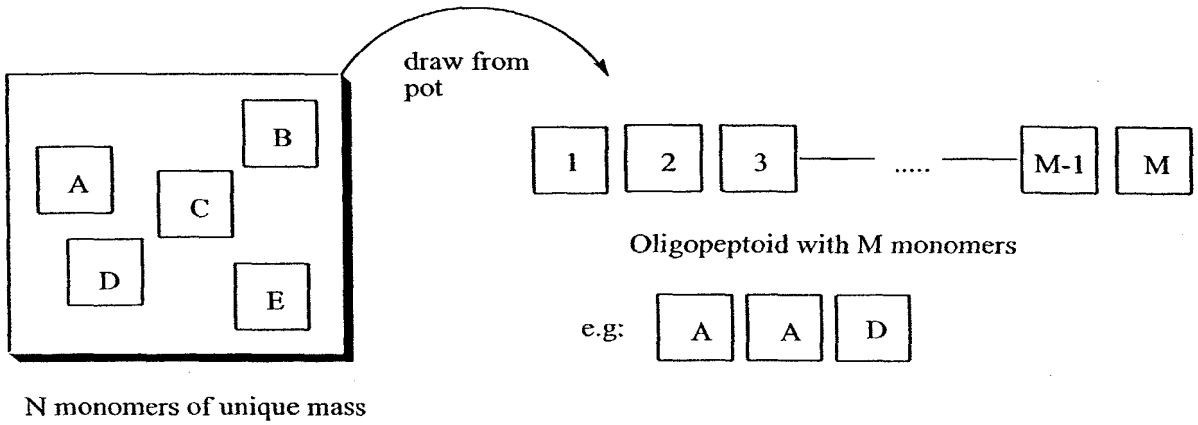


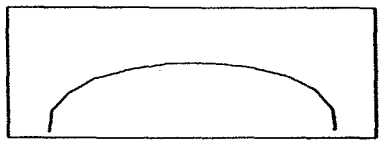
FIGURE 5



L = # of different peptoids with a unique combination of monomers

$$L = \binom{M+N-1}{N}$$

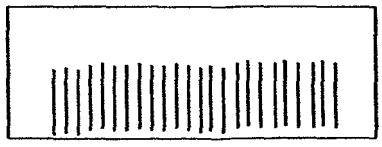
Example: 10 monomers, hexamer peptoids, yields 5005 combinations, or 8007 if pentamers and fewer are used too.



Mostly uniform distribution of molecular weights

Process library by removing coincidental combinations, when two unique combinations have the same mass

Also enforce other requirements, such as a minimum of X Daltons between species, or structural requirements such as at least two charged bases.



Desirable distribution of molecular weights

Assign oligo probes to tags and log, output library structure to peptoid synthesizer

FIGURE 6

Figure 7

N \ M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
3	3	6	10	15	21	28	36	45	55	66	78	91	105	120	136	153	171	190	210	231	253	276	300	325	351
4	4	10	20	35	56	84	120	165	220	286	364	455	560	680	816	969	1140	1330	1540	1771	2024	2300	2600	2925	3276
5	5	15	35	70	126	210	330	495	715	1001	1365	1820	2380	3060	3876	4845	5985	7315	8855	10626	12650	14950	17550	20475	23751
6	6	21	56	126	252	462	792	1287	2002	3003	4368	6188	8568	11628	15504	20349	26334	33649	42504	53130	65780	80730	98280	118755	142506
7	7	28	84	210	462	924	1716	3003	5005	8008	12376	18564	27132	38760	54264	74613	100947	134596	177100	230230	296010	376740	475020	593775	736281
8	8	36	120	330	792	1716	3432	6435	11440	19448	31824	50388	77520	116280	170544	245157	346104	480700	657800	888030	1184040	1560780	2035800	2629575	3365856
9	9	45	165	495	1287	3003	6435	12870	24310	43758	75582	125970	203490	319770	490314	735471	1081575	1562275	2220075	3108105	4292145	5852925	7888725	1.1E+07	1.4E+07
10	10	55	220	715	2002	5005	11440	24310	48620	92378	167960	293930	497420	817190	1307504	2042975	3124550	4686825	6906900	1E+07	1.4E+07	2E+07	2.8E+07	3.9E+07	5.2E+07
11	11	66	286	1001	3003	8008	19448	43758	92378	184756	352716	646646	1144066	1961256	3268760	5311735	8436285	1.3E+07	2E+07	3E+07	4.4E+07	6.5E+07	9.3E+07	1.3E+08	1.8E+08
12	12	78	364	1365	4368	12376	31824	75582	167960	352716	705432	1352078	2496144	4457400	7726160	1.3E+07	2.1E+07	3.5E+07	5.5E+07	8.5E+07	1.3E+08	1.9E+08	2.9E+08	4.2E+08	6E+08
13	13	91	455	1820	6188	18564	50388	125970	293930	646646	1352078	2704156	5200300	9657700	17383860	3E+07	5.2E+07	8.6E+07	1.4E+08	2.3E+08	3.5E+08	5.5E+08	8.3E+08	1.3E+09	1.9E+09
14	14	105	560	2380	8568	27132	77520	203490	497420	1144066	2496144	5200300	10400600	20058300	37442160	6.8E+07	1.2E+08	2.1E+08	3.5E+08	5.7E+08	9.3E+08	1.5E+09	2.3E+09	3.6E+09	5.4E+09
15	15	120	680	3060	11628	38760	116280	319770	817190	1961256	4457400	9657700	20058300	40116600	77558760	1.5E+08	2.7E+08	4.7E+08	8.2E+08	1.4E+09	2.3E+09	3.8E+09	6.1E+09	9.7E+09	1.5E+10
16	16	136	816	3876	15504	54264	170544	490314	1307504	3268760	7726160	17383860	37442160	77558760	1.55E+08	3E+08	5.7E+08	1E+09	1.9E+09	3.2E+09	5.6E+09	9.4E+09	1.5E+10	2.5E+10	4E+10
17	17	153	969	4845	20349	74613	245157	735471	2042975	5311735	13037895	30421755	67863915	1.45E+08	3.01E+08	6E+08	1.2E+09	2.2E+09	4.1E+09	7.3E+09	1.3E+10	2.2E+10	3.8E+10	6.3E+10	1E+11
18	18	171	1140	5985	26334	100947	346104	1081575	3124550	8436285	21474180	51895935	1.2E+08	2.65E+08	5.66E+08	1.2E+09	2.3E+09	4.5E+09	8.6E+09	1.6E+10	2.9E+10	5.1E+10	8.9E+10	1.5E+11	2.5E+11
19	19	190	1330	7315	33649	134596	480700	1562275	4686825	13123110	34597290	86493225	2.06E+08	4.71E+08	1.04E+09	2.2E+09	4.5E+09	9.1E+09	1.8E+10	3.4E+10	6.2E+10	1.1E+11	2E+11	3.5E+11	6.1E+11
20	20	210	1540	8855	42504	177100	657800	2220075	6906900	20030010	54627300	1.41E+08	3.47E+08	8.19E+08	1.86E+09	4.1E+09	8.6E+09	1.8E+10	3.5E+10	6.9E+10	1.3E+11	2.4E+11	4.5E+11	8E+11	1.4E+12
21	21	231	1771	10626	53130	230230	888030	3108105	10015005	30045015	84672315	2.26E+08	5.73E+08	1.39E+09	3.25E+09	7.3E+09	1.6E+10	3.4E+10	6.9E+10	1.4E+11	2.7E+11	5.1E+11	9.6E+11	1.8E+12	3.2E+12
22	22	253	2024	12650	65780	296010	1184040	4292145	14307150	44352165	1.29E+08	3.55E+08	9.28E+08	2.32E+09	5.57E+09	1.3E+10	2.9E+10	6.2E+10	1.3E+11	2.7E+11	5.4E+11	1.1E+12	2E+12	3.8E+12	6.9E+12
23	23	276	2300	14950	80730	376740	1560780	5852925	20160075	64512240	1.94E+08	5.48E+08	1.48E+09	3.8E+09	9.36E+09	2.2E+10	5.1E+10	1.1E+11	2.4E+11	5.1E+11	1.1E+12	2.1E+12	4.1E+12	7.9E+12	1.5E+13
24	24	300	2600	17550	98280	475020	2035800	7888725	28048800	92561040	2.86E+08	8.34E+08	2.31E+09	6.11E+09	1.55E+10	3.8E+10	8.9E+10	2E+11	4.5E+11	9.6E+11	2E+12	4.1E+12	8.2E+12	1.6E+13	3.1E+13
25	25	325	2925	20475	118755	593775	2629575	10518300	38567100	1.31E+08	4.17E+08	1.25E+09	3.56E+09	9.67E+09	2.51E+10	6.3E+10	1.5E+11	3.5E+11	8E+11	1.8E+12	3.8E+12	7.9E+12	1.6E+13	3.2E+13	6.3E+13
26	26	351	3276	23751	142506	736281	3365856	13884156	52451256	1.84E+08	6.01E+08	1.85E+09	5.41E+09	1.51E+10	4.02E+10	1E+11	2.5E+11	6.1E+11	1.4E+12	3.2E+12	6.9E+12	1.5E+13	3.1E+13	6.3E+13	1.3E+14
27	27	378	3654	27405	169911	906192	4272048	18156204	70607460	2.54E+08	8.55E+08	2.71E+09	8.12E+09	2.32E+10	6.34E+10	1.7E+11	4.2E+11	1E+12	2.4E+12	5.6E+12	1.3E+13	2.7E+13	5.8E+13	1.2E+14	2.5E+14
28	28	406	4060	31465	201376	1107568	5379616	23535820	94143280	3.48E+08	1.2E+09	3.91E+09	1.2E+10	3.52E+10	9.87E+10	2.7E+11	6.9E+11	1.7E+12	4.2E+12	9.8E+12	2.2E+13	5E+13	1.1E+14	2.3E+14	4.8E+14
29	29	435	4495	35960	237336	1344904	6724520	30260340	1.24E+08	4.73E+08	1.68E+09	5.59E+09	1.76E+10	5.29E+10	1.52E+11	4.2E+11	1.1E+12	2.8E+12	7E+12	1.7E+13	3.9E+13	8.9E+13	2E+14	4.3E+14	9E+14
30	30	465	4960	40920	278256	1623160	8347680	38608020	1.63E+08	6.36E+08	2.31E+09	7.9E+09	2.55E+10	7.84E+10	2.3E+11	6.5E+11	1.7E+12	4.6E+12	1.2E+13	2.8E+13	6.7E+13	1.6E+14	3.5E+14	7.8E+14	1.7E+15
31	31	496	5456	46376	324632	1947792	10295472	48903492	2.12E+08	8.48E+08	3.16E+09	1.11E+10	3.66E+10	1.15E+11	3.45E+11	9.9E+11	2.7E+12	7.3E+12	1.9E+13	4.7E+13	1.1E+14	2.7E+14	6.2E+14	1.4E+15	3.1E+15
32	32	528	5984	52360	376992	2324784	12620256	61523748	2.73E+08	1.12E+09	4.28E+09	1.53E+10	5.19E+10	1.67E+11	5.12E+11	1.5E+12	4.2E+12	1.2E+13	3E+13	7.8E+13	1.9E+14	4.6E+14	1.1E+15	2.5E+15	5.6E+15
33	33	561	6545	58905	435897	2760681	15380937	76904685	3.5E+08	1.47E+09	5.75E+09	2.11E+10	7.3E+10	2.4E+11	7.52E+11	2.3E+12	6.5E+12	1.8E+13	4.8E+13	1.3E+14	3.2E+14	7.8E+14	1.9E+15	4.4E+15	9.9E+15
34	34	595	7140	66045	501942	3262623	18643560	95548245	4.46E+08	1.92E+09	7.67E+09	2.88E+10	1.02E+11	3.42E+11	1.09E+12	3.3E+12	9.8E+12	2.8E+13	7.6E+13	2E+14	5.2E+14	1.3E+15	3.2E+15	7.5E+15	1.7E+16
35	35	630	7770	73815	575757	3838380	22481940	1.18E+08	5.64E+08	2.48E+09	1.02E+10	3.89E+10	1.41E+11	4.82E+11	1.58E+12	4.9E+12	1.5E+13	4.3E+13	1.2E+14	3.2E+14	8.4E+14	2.1E+15	5.3E+15	1.3E+16	3E+16
36	36	666	8436	82251	658008	4496388	26978328	1.45E+08	7.09E+08	3.19E+09	1.33E+10	5.23E+10	1.93E+11	6.75E+11	2.25E+12	7.2E+12	2.2E+13	6.5E+13	1.8E+14	5.1E+14	1.3E+15	3.5E+15	8.8E+15	2.2E+16	5.2E+16
37	37	703	9139	91390	749398	5245786	32224114	1.77E+08	8.86E+08	4.08E+09	1.74E+10	6.97E+10	2.63E+11	9.38E+11	3.19E+12	1E+13	3.2E+13	9.7E+13	2.8E+14	7.9E+14	2.1E+15	5.6E+15	1.4E+16	3.6E+16	8.8E+16
38	38	741	9880	101270	850668	6096454	38320568	2.16E+08	1.1E+09	5.18E+09	2.26E+10	9.23E+10	3.55E+11	1.29E+12	4.48E+12	1.5E+13	4.7E+13	1.4E+14	4.2E+14	1.2E+15	3.3E+15	9E+15	2.3E+16	5.9E+16	1.5E+17
39	39	780	10660	111930	962598	7059052	45379620	2.61E+08	1.36E+09	6.54E+09	2.91E+10	1.21E+11	4.76E+11	1.77E+12	6.25E+12	2.1E+13	6.8E+13	2.1E+14	6.4E+14	1.8E+15	5.2E+15	1.4E+16	3.8E+16	9.7E+16	2.4E+17
40	40	820	11480	123410	1086008	8145060	53524680	3.14E+08	1.68E+09	8.22E+09	3.74E+10	1.59E+11	6.35E+11	2.4E+12	8.65E+12	3E+13	9.8E+13	3.1E+14	9.5E+14	2.8E+15	8E+15	2.2E+16	6E+16	1.6E+17	4E+17

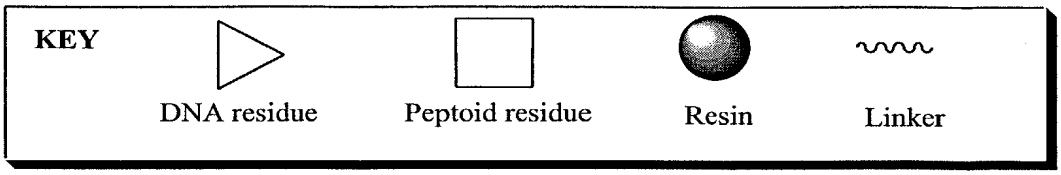
M=length of polypeptoid
N=# of monomers of unique mass

Figure 8A

N \ M	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	1	6	7	8	9	1	10
2	2	5	9	14	20	27	35	44	54	65	77	90
3	3	9	19	34	55	83	119	164	219	285	363	454
4	4	14	34	69	125	209	329	494	714	1000	1364	1819
5	5	20	55	125	251	461	791	1286	2001	3002	4367	6187
6	6	27	83	209	461	923	1715	3002	5004	8007	12375	18563
7	7	35	119	329	791	1715	3431	6434	11439	19447	31823	50387
8	8	44	164	494	1286	3002	6434	12869	24309	43757	75581	125969
9	9	54	219	714	2001	5004	11439	24309	48619	92377	167959	293929
10	10	65	285	1000	3002	8007	19447	43757	92377	184755	352715	646645
11	11	77	363	1364	4367	12375	31823	75581	167959	352715	705431	1352077
12	12	90	454	1819	6187	18563	50387	125969	293929	646645	1352077	2704155
13	13	104	559	2379	8567	27131	77519	203489	497419	1144065	2496143	5200299
14	14	119	679	3059	11627	38759	116279	319769	817189	1961255	4457399	9657699
15	15	135	815	3875	15503	54263	170543	490313	1307503	3268759	7726159	17383859
16	16	152	968	4844	20348	74612	245156	735470	2042974	5311734	13037894	30421754
17	17	170	1139	5984	26333	100946	346103	1081574	3124549	8436284	21474179	51895934
18	18	189	1329	7314	33648	134595	480699	1562274	4686824	13123109	34597289	86493224
19	19	209	1539	8854	42503	177099	657799	2220074	6906899	20030009	54627299	141120524
20	20	230	1770	10625	53129	230229	888029	3108104	10015004	30045014	84672314	225792839
21	21	252	2023	12649	65779	296009	1184039	4292144	14307149	44352164	129024479	354817319
22	22	275	2299	14949	80729	376739	1560779	5852924	20160074	64512239	193536719	548354039
23	23	299	2599	17549	98279	475019	2035799	7888724	28048799	92561039	286097759	834451799
24	24	324	2924	20474	118754	593774	2629574	10518299	38567099	131128139	417225899	1251677699
25	25	350	3275	23750	142505	736280	3365855	13884155	52451255	183579395	600805295	1852482995
26	26	377	3653	27404	169910	906191	4272047	18156203	70607459	254186855	854992151	2707475147
27	27	405	4059	31464	201375	1107567	5379615	23535819	94143279	348330135	1203322287	3910797435
28	28	434	4494	35959	237335	1344903	6724519	30260339	124403619	472733755	1676056043	5586853479
29	29	464	4959	40919	278255	1623159	8347679	38608019	163011639	635745395	2311801439	7898654919
30	30	495	5455	46375	324631	1947791	10295471	48903491	211915131	847660527	3159461967	11058116887
31	31	527	5983	52359	376991	2324783	12620255	61523747	273438879	1121099407	4280561375	15338678263
32	32	560	6544	58904	435896	2760680	15380936	76904684	350343564	1471442972	5752004348	21090682612
33	33	594	7139	66044	501941	3262622	18643559	95548244	445891809	1917334782	7669339131	28760021744
34	34	629	7769	73814	575756	3838379	22481939	118030184	563921994	2481256777	10150595909	38910617654
35	35	665	8435	82250	658007	4496387	26978327	145008512	708930507	3190187285	13340783195	52251400850
36	36	702	9138	91389	749397	5245785	32224113	177232626	886163134	4076350420	17417133616	69668534467
37	37	740	9879	101269	850667	6096453	38320567	215553194	1101716329	5178066750	22595200367	92263734835
38	38	779	10659	111929	962597	7059051	45379619	260932814	1362649144	6540715895	29135916263	1.21E+11
39	39	819	11479	123409	1086007	8145059	53524679	314457494	1677106639	8217822535	37353738799	1.59E+11
40	40	860	12340	135750	1221758	9366818	62891498	377348993	2054455633	10272278169	47626016969	2.06E+11

Figure 8B

	M	13	14	15	16	17	18	19	20	21	22	23	24	25
N	1	11	12	13	1	14	15	16	17	1	18	19	20	21
1	1	104	119	135	152	170	189	209	230	252	275	299	324	350
2	2	559	679	815	968	1139	1329	1539	1770	2023	2299	2599	2924	3275
3	3	2379	3059	3875	4844	5984	7314	8854	10625	12649	14949	17549	20474	23750
4	4	8567	11627	15503	20348	26333	33648	42503	53129	65779	80729	98279	118754	142505
5	5	27131	38759	54263	74612	100946	134595	177099	230229	296009	376739	475019	593774	736280
6	6	77519	116279	170543	245156	346103	480699	657799	888029	1184039	1560779	2035799	2629574	3365855
7	7	203489	319769	490313	735470	1081574	1562274	2220074	3108104	4292144	5852924	7888724	10518299	13884155
8	8	497419	817189	1307503	2042974	3124549	4686824	6906899	10015004	14307149	20160074	28048799	38567099	52451255
9	9	1144065	1961255	3268759	5311734	8436284	13123109	20030009	30045014	44352164	64512239	92561039	131128139	183579395
10	10	2496143	4457399	7726159	13037894	21474179	34597289	54627299	84672314	129024479	193536719	286097759	417225899	600805295
11	11	5200299	9657699	17383859	30421754	51895934	86493224	141120524	225792839	354817319	548354039	834451799	1251677699	1852482995
12	12	10400599	20058299	37442159	67863914	119759849	206253074	347373599	573166439	927983759	1476337799	2310789599	3562467299	5414950295
13	13	20058299	40116599	77558759	145422674	265182524	471435599	818809199	1391975639	2319959399	3796297199	6107086799	9669554099	15084504395
14	14	37442159	77558759	155117519	300540194	565722719	1037158319	1855967519	3247943159	5567902559	9364199759	15471286559	25140840659	40225345055
15	15	67863914	145422674	300540194	601080389	1166803109	2203961429	4059928949	7307872109	12875774669	22239974429	37711260989	62852101649	1.03077E+11
16	16	119759849	265182524	565722719	1166803109	2333606219	4537567649	8597496599	15905368709	28781143379	51021117809	88732378799	1.51584E+11	2.54662E+11
17	17	206253074	471435599	1037158319	2203961429	4537567649	9075135299	17672631899	33578000609	62359143989	1.1338E+11	2.02113E+11	3.53697E+11	6.08359E+11
18	18	347373599	818809199	1855967519	4059928949	8597496599	17672631899	35345263799	68923264409	1.31282E+11	2.44663E+11	4.46775E+11	8.00472E+11	1.40883E+12
19	19	573166439	1391975639	3247943159	7307872109	15905368709	33578000609	68923264409	1.37847E+11	2.69129E+11	5.13792E+11	9.60567E+11	1.76104E+12	3.16987E+12
20	20	927983759	2319959399	5567902559	12875774669	28781143379	62359143989	1.31282E+11	2.69129E+11	5.38258E+11	1.05205E+12	2.01262E+12	3.77366E+12	6.94353E+12
21	21	1476337799	3796297199	9364199759	22239974429	51021117809	1.1338E+11	2.44663E+11	5.13792E+11	1.05205E+12	2.1041E+12	4.11672E+12	7.89037E+12	1.48339E+13
22	22	2310789599	6107086799	15471286559	37711260989	88732378799	2.02113E+11	4.46775E+11	9.60567E+11	2.01262E+12	4.11672E+12	8.23343E+12	1.61238E+13	3.09577E+13
23	23	3562467299	9669554099	25140840659	62852101649	1.51584E+11	3.53697E+11	8.00472E+11	1.76104E+12	3.77366E+12	7.89037E+12	1.61238E+13	3.22476E+13	6.32053E+13
24	24	5414950295	15084504395	40225345055	1.03077E+11	2.54662E+11	6.08359E+11	1.40883E+12	3.16987E+12	6.94353E+12	1.48339E+13	3.09577E+13	6.32053E+13	1.26411E+14
25	25	8122425443	23206929839	63432274895	1.6651E+11	4.21172E+11	1.02953E+12	2.43836E+12	5.60823E+12	1.25518E+13	2.73857E+13	5.83434E+13	1.21549E+14	2.47959E+14
26	26	12033222879	35240152719	98672427615	2.65182E+11	6.86354E+11	1.71588E+12	4.15425E+12	9.76248E+12	2.23142E+13	4.96999E+13	1.08043E+14	2.29592E+14	4.77551E+14
27	27	17620076359	52860229079	1.51533E+11	4.16715E+11	1.10307E+12	2.81895E+12	6.9732E+12	1.67357E+13	3.90499E+13	8.87498E+13	1.96793E+14	4.26385E+14	9.03936E+14
28	28	25518731279	78378960359	2.29912E+11	6.46626E+11	1.7497E+12	4.56865E+12	1.15418E+13	2.82775E+13	6.73274E+13	1.56077E+14	3.5287E+14	7.79255E+14	1.68319E+15
29	29	36576848167	1.14956E+11	3.44867E+11	9.91494E+11	2.74119E+12	7.30984E+12	1.88517E+13	4.71292E+13	1.14457E+14	2.70534E+14	6.23404E+14	1.40266E+15	3.08585E+15
30	30	51915526431	1.66871E+11	5.11739E+11	1.50323E+12	4.24442E+12	1.15543E+13	3.04059E+13	7.75352E+13	1.91992E+14	4.62526E+14	1.08593E+15	2.48859E+15	5.57444E+15
31	31	73006209044	2.39878E+11	7.51616E+11	2.25485E+12	6.49927E+12	1.80535E+13	4.84595E+13	1.25995E+14	3.17986E+14	7.80512E+14	1.86644E+15	4.35503E+15	9.92947E+15
32	32	1.01766E+11	3.41644E+11	1.09326E+12	3.34811E+12	9.84738E+12	2.79009E+13	7.63604E+13	2.02355E+14	5.20341E+14	1.30085E+15	3.1673E+15	7.52233E+15	1.74518E+16
33	33	1.40677E+11	4.82321E+11	1.57558E+12	4.92369E+12	1.47711E+13	4.2672E+13	1.19032E+14	3.21387E+14	8.41729E+14	2.14258E+15	5.30988E+15	1.28322E+16	3.0284E+16
34	34	1.92928E+11	6.75249E+11	2.25083E+12	7.17452E+12	2.19456E+13	6.46176E+13	1.8365E+14	5.05037E+14	1.34677E+15	3.48935E+15	8.79923E+15	2.16314E+16	5.19154E+16
35	35	2.62597E+11	9.37846E+11	3.18868E+12	1.03632E+13	3.23088E+13	9.69263E+13	2.80576E+14	7.85614E+14	2.13238E+15	5.62173E+15	1.4421E+16	3.60524E+16	8.79678E+16
36	36	3.54861E+11	1.29271E+12	4.48138E+12	1.48446E+13	4.71534E+13	1.4408E+14	4.24656E+14	1.21027E+15	3.34265E+15	8.96438E+15	2.33853E+16	5.94377E+16	1.47406E+17
37	37	4.7626E+11	1.76897E+12	6.25035E+12	2.10949E+13	6.82483E+13	2.12328E+14	6.36984E+14	1.84725E+15	5.1899E+15	1.41543E+16	3.75396E+16	9.69773E+16	2.44383E+17
38	38	6.35014E+11	2.40398E+12	8.65433E+12	2.97493E+13	9.79975E+13	3.10326E+14	9.47309E+14	2.79456E+15	7.98447E+15	2.21387E+16	5.96784E+16	1.56656E+17	4.01039E+17
39	39	8.41393E+11	3.24537E+12	1.18997E+13	4.1649E+13	1.39646E+14	4.49972E+14	1.39728E+15	4.19184E+15	1.21763E+16	3.43151E+16	9.39934E+16	2.50649E+17	6.51688E+17
40	40													



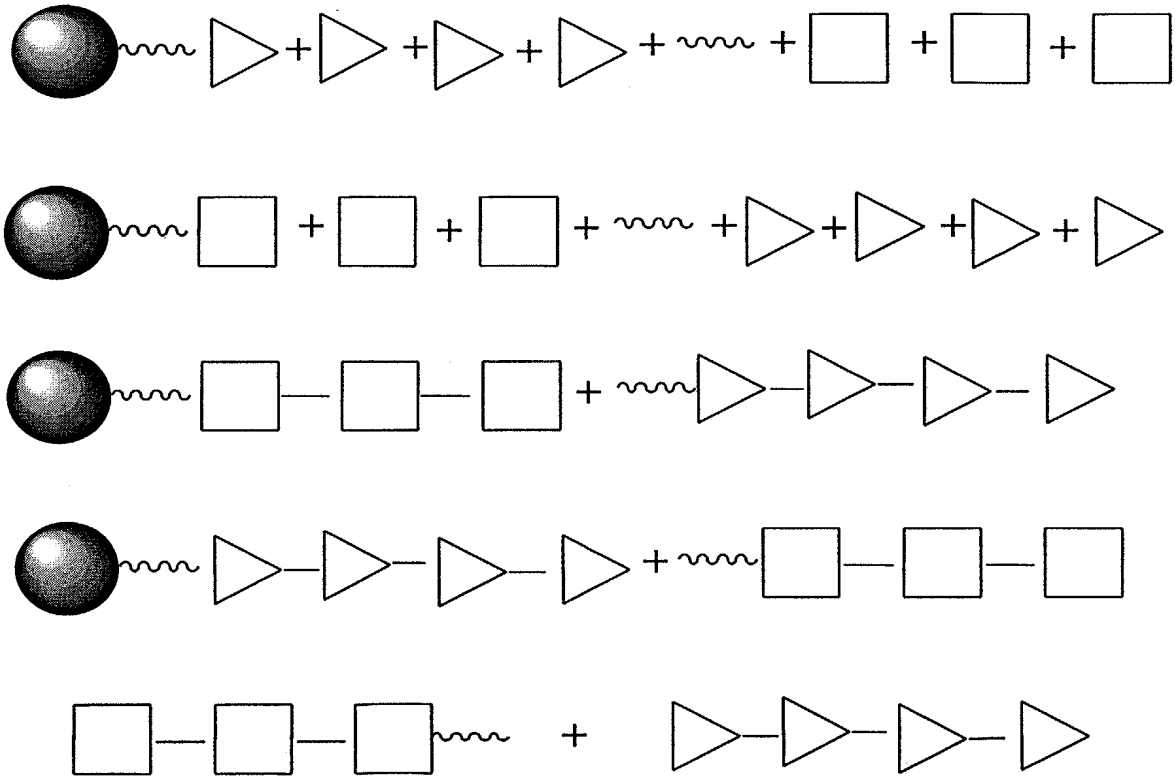


FIGURE 9

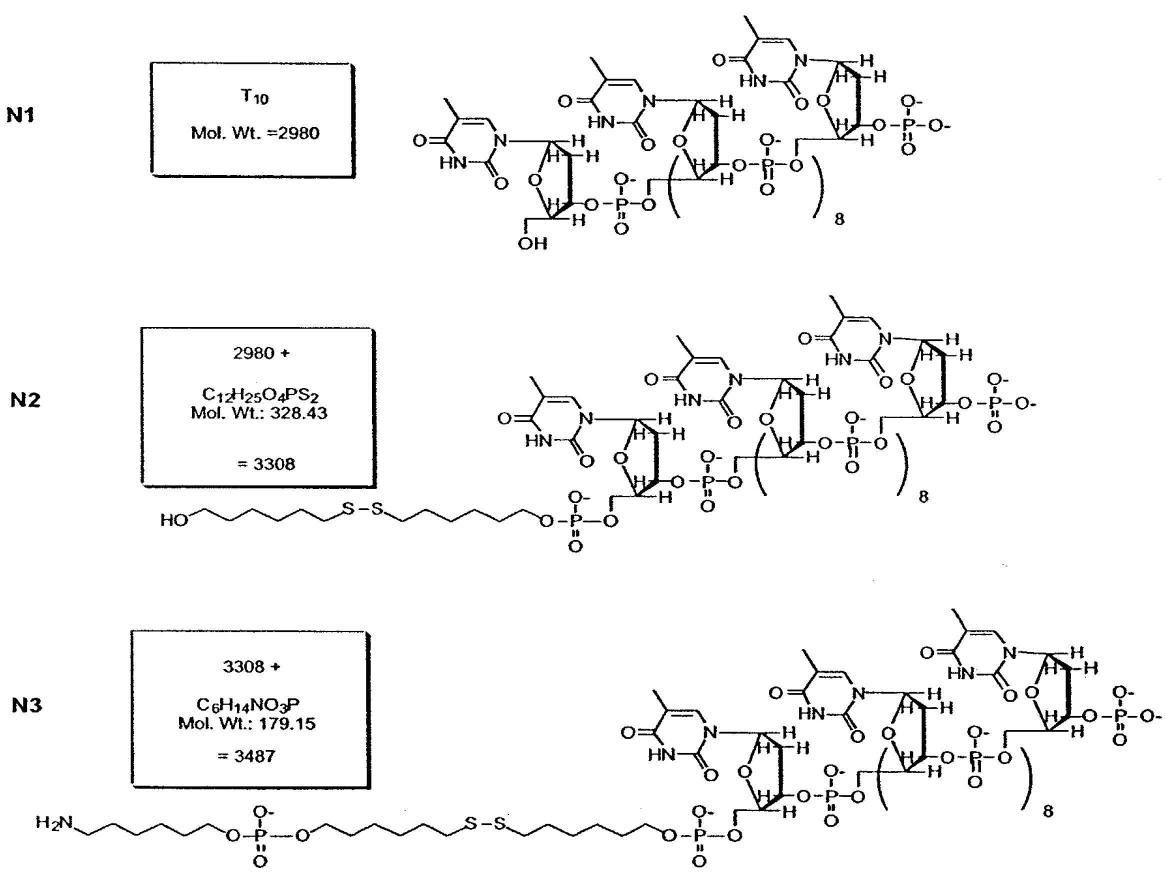


FIGURE 10

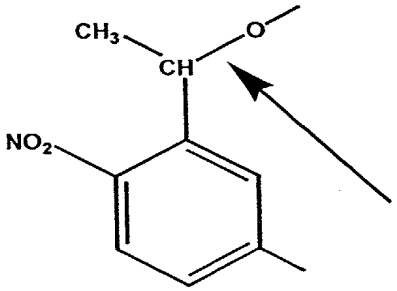


FIGURE 11A

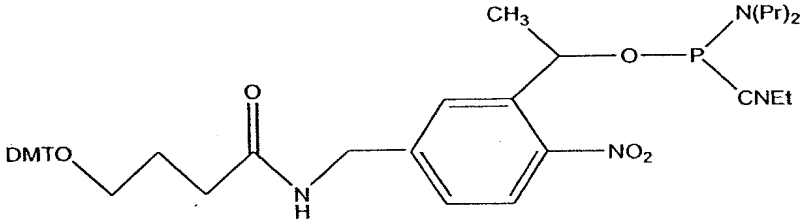


FIGURE 11B

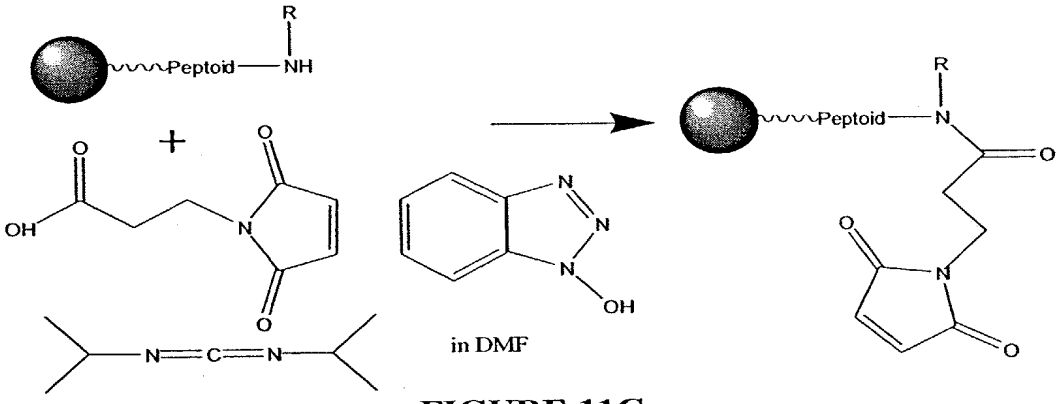


FIGURE 11C

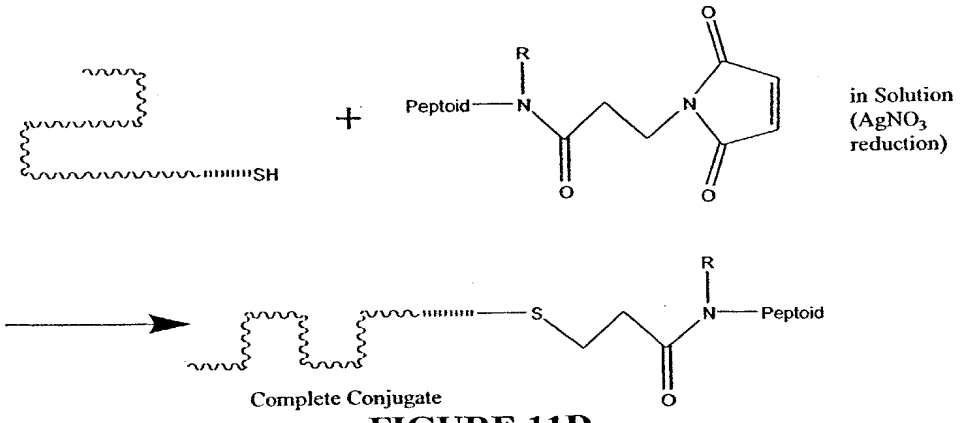


FIGURE 11D

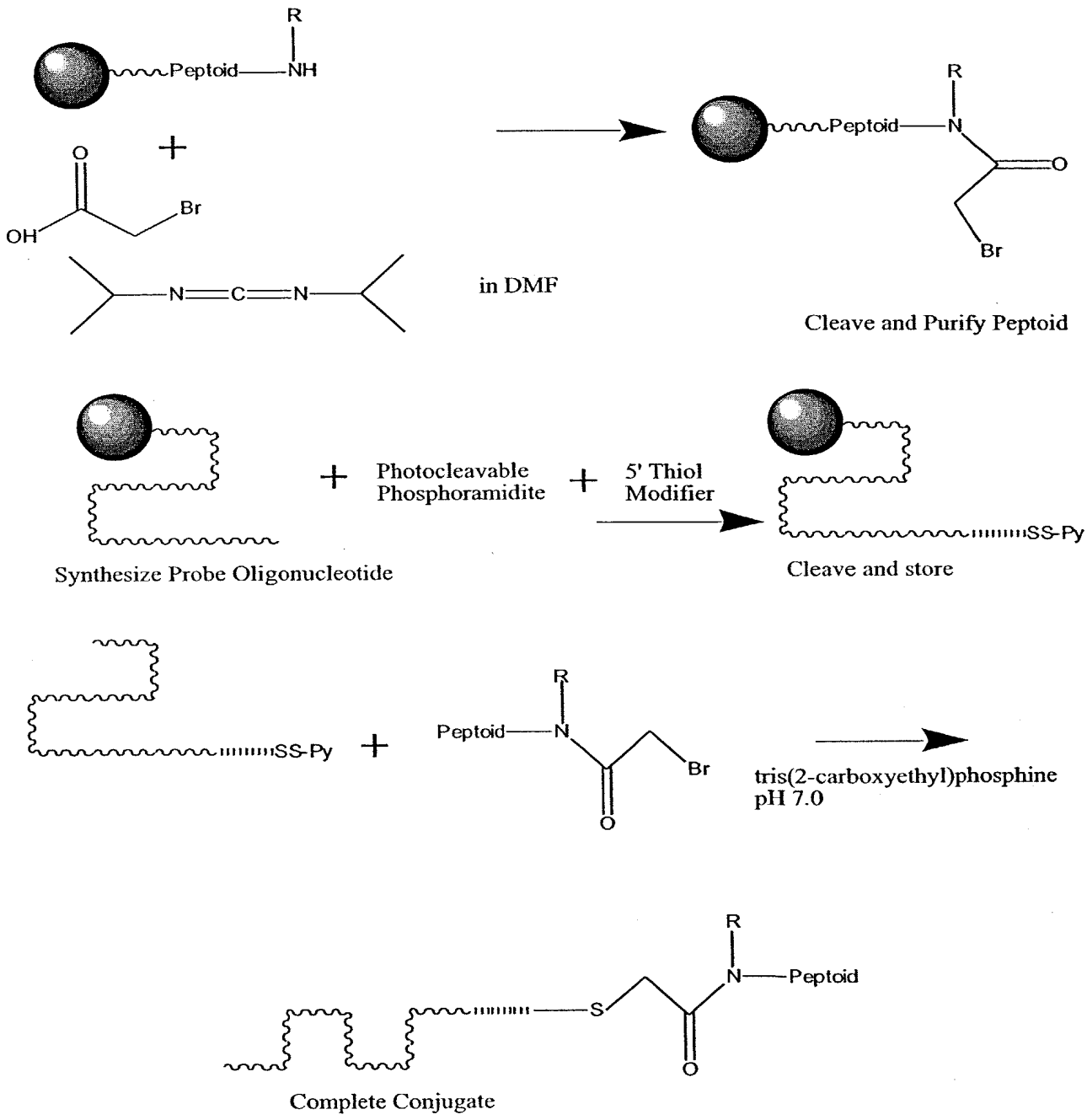
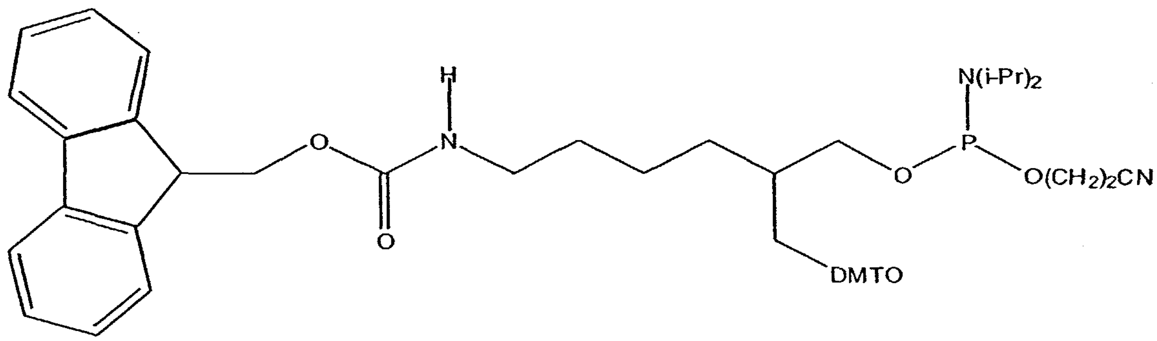

R
Peptoid
NH
O
OH
Br
N=C=N
in DMF
Peptoid
N
O
Br
Cleave and Purify Peptoid
Synthesize Probe Oligonucleotide
Photocleavable Phosphoramidite
5' Thiol Modifier
SS-Py
Cleave and store
SS-Py
Peptoid
N
Br
O
tris(2-carboxyethyl)phosphine
pH 7.0
R
N
Peptoid
S
O
Complete Conjugate

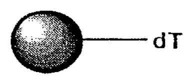
FIGURE 11E



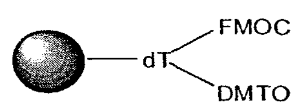
Clontech "Uni-Link AminoModifier" Branched Phosphoramidite

Method

1. Obtain Oligonucleotide Resin with dT base



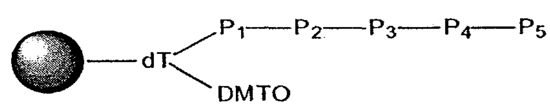
2. Add Branched Phosphoramidite



3. Transfer to Peptoid Synthesizer

4. Deprotect FMOC

5. Add Peptoid



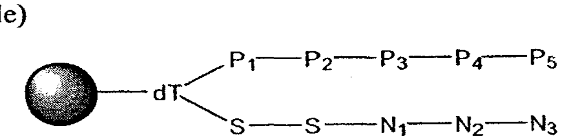
6. Protect Terminus

7. Return to ODN Synthesizer

8. Deprotect DMTO

9. Add cleavable units (Disulfide or Photocleavable)

10. Synthesize ODN



11. Deprotect and Cleave Completed Unit

FIGURE 12

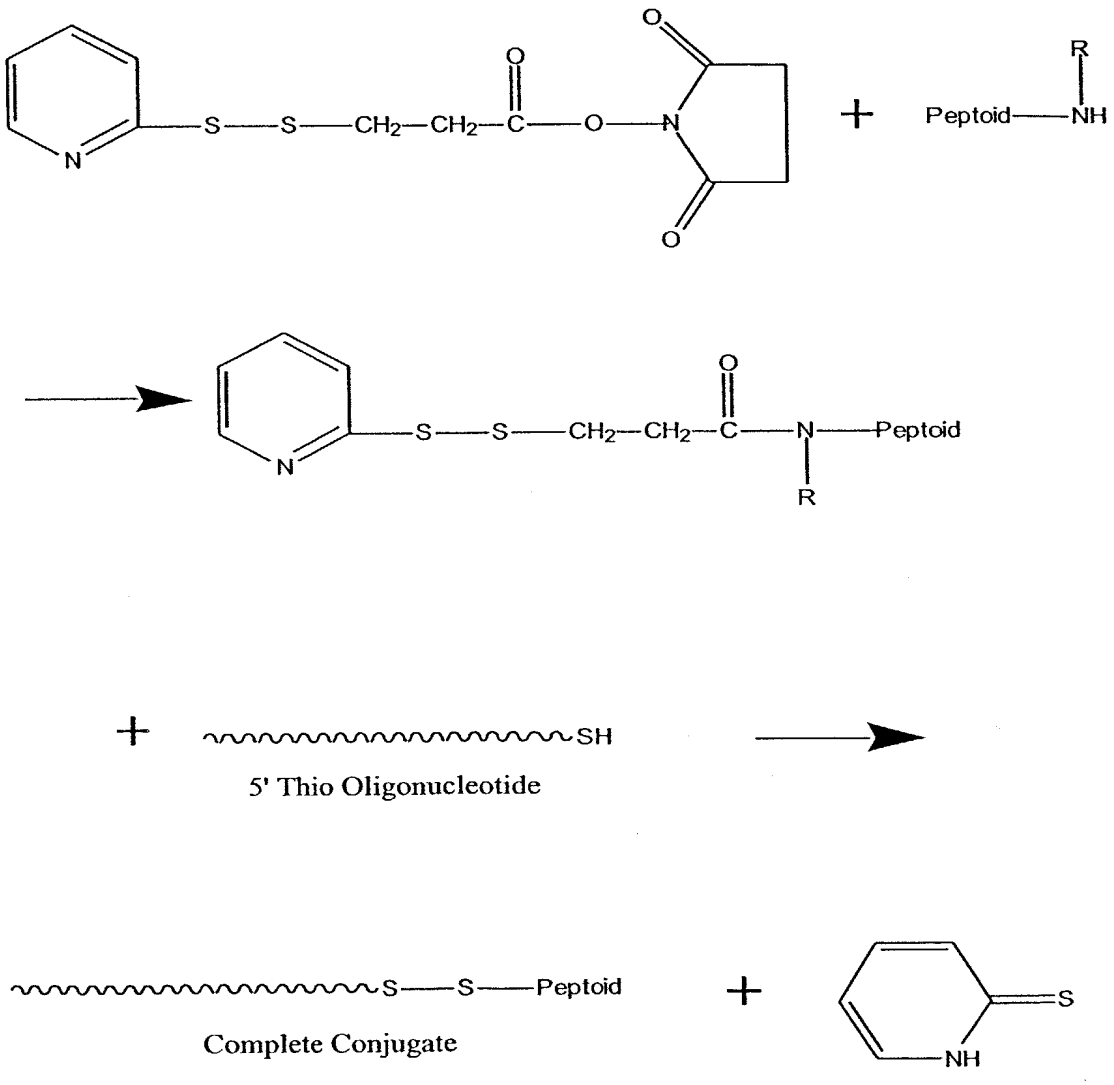

S—S—CH2—CH2—C—O—N
O
O
O
N
+
Peptoid—NH
R
S—S—CH2—CH2—C—N—Peptoid
O
R
+
SH
5' Thio Oligonucleotide
S—S—Peptoid
Complete Conjugate
+
S
NH

FIGURE 13

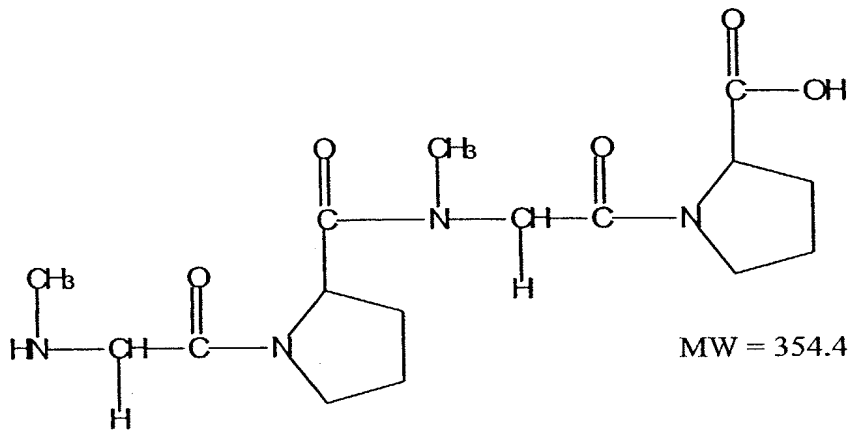


FIGURE 14

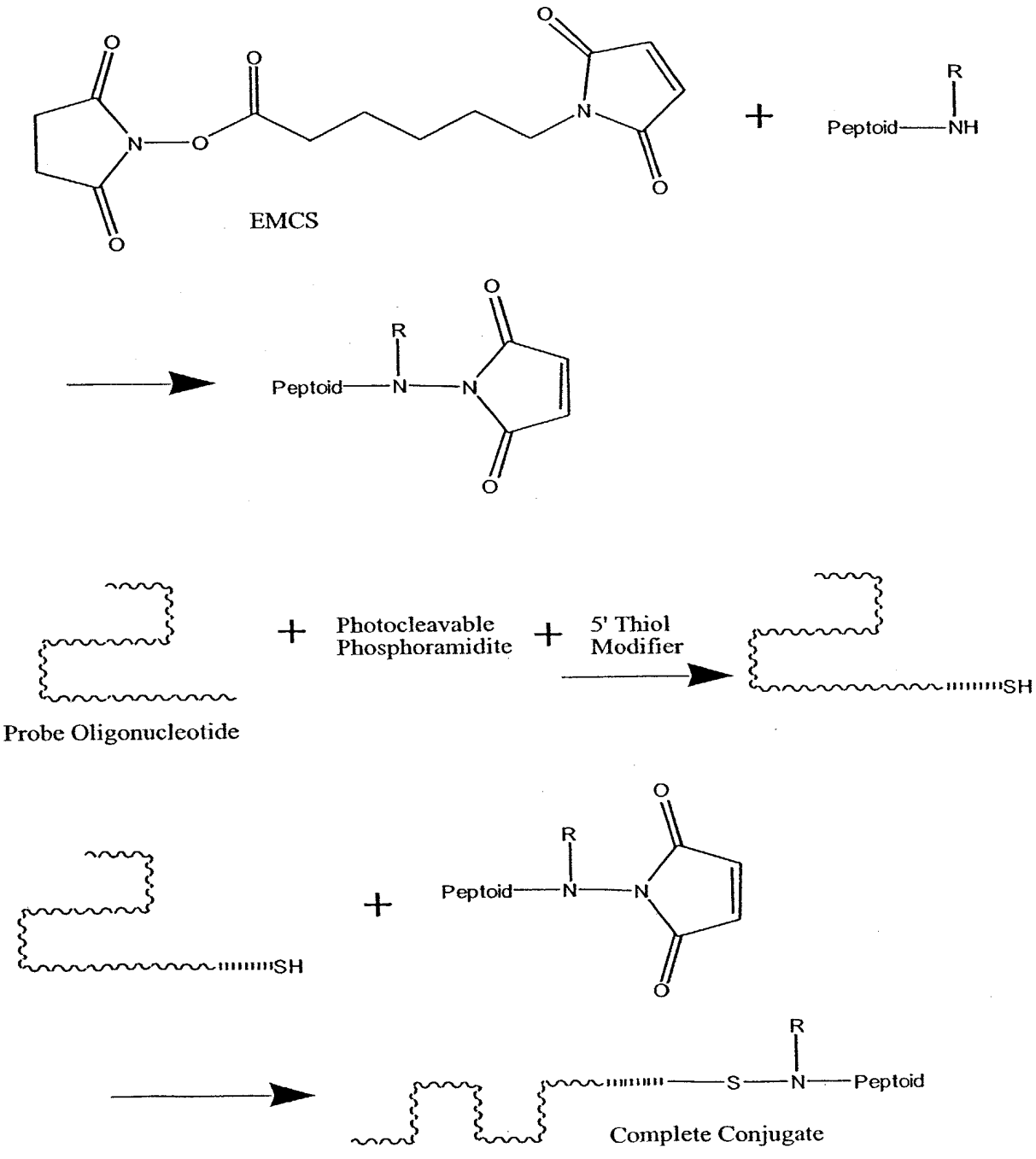
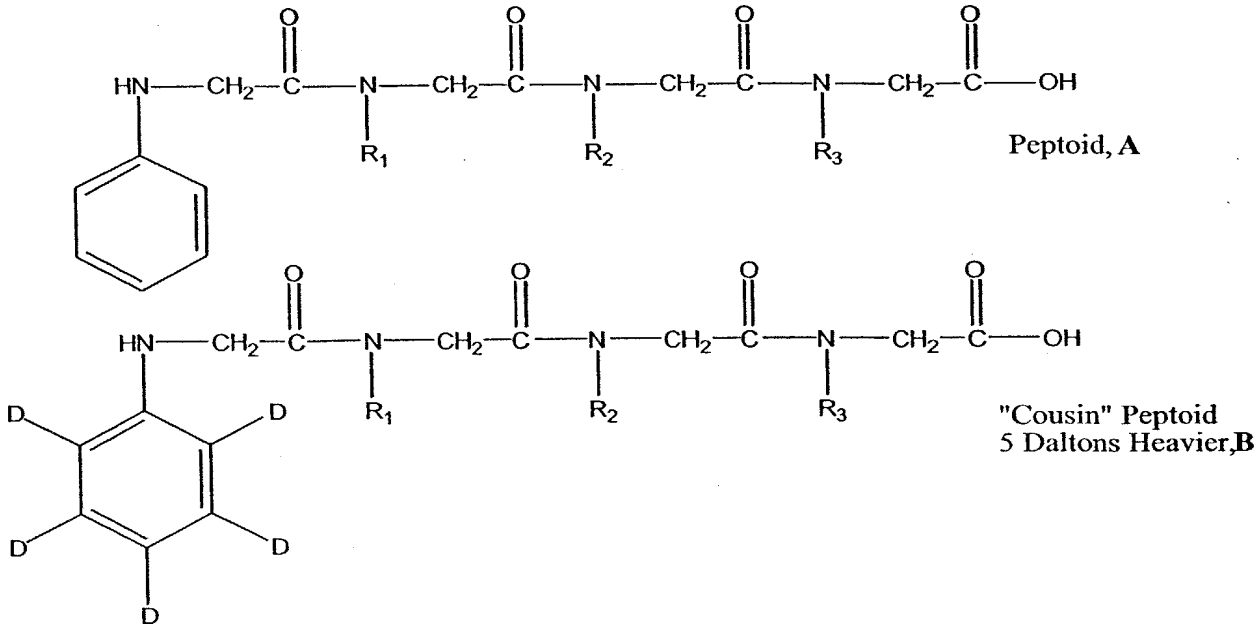

EMCS
Peptoid
NH
R
Peptoid
N
N
Photocleavable
Phosphoramidite
5' Thiol
Modifier
SH
Probe Oligonucleotide
SH
Peptoid
N
N
S
N
Peptoid
Complete Conjugate

FIGURE 15


HN—CH2—C—N—CH2—C—N—CH2—C—N—CH2—C—OH
R1
R2
R3
Peptoid, A
D
"Cousin" Peptoid
5 Daltons Heavier,B

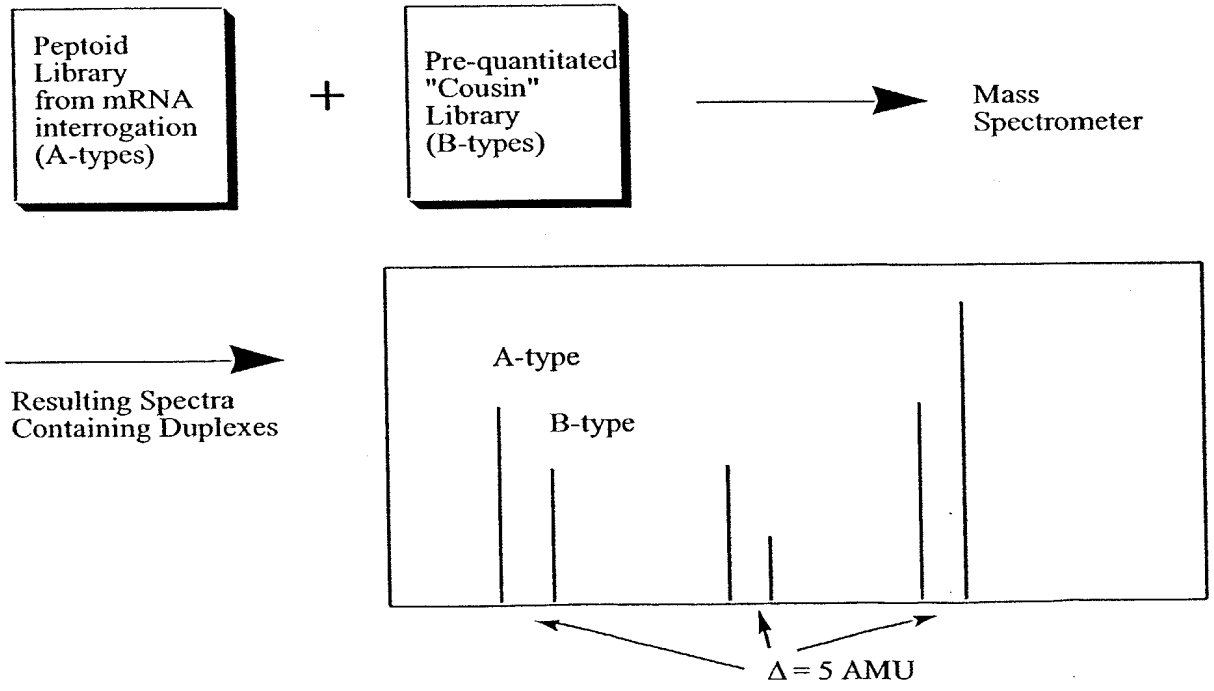
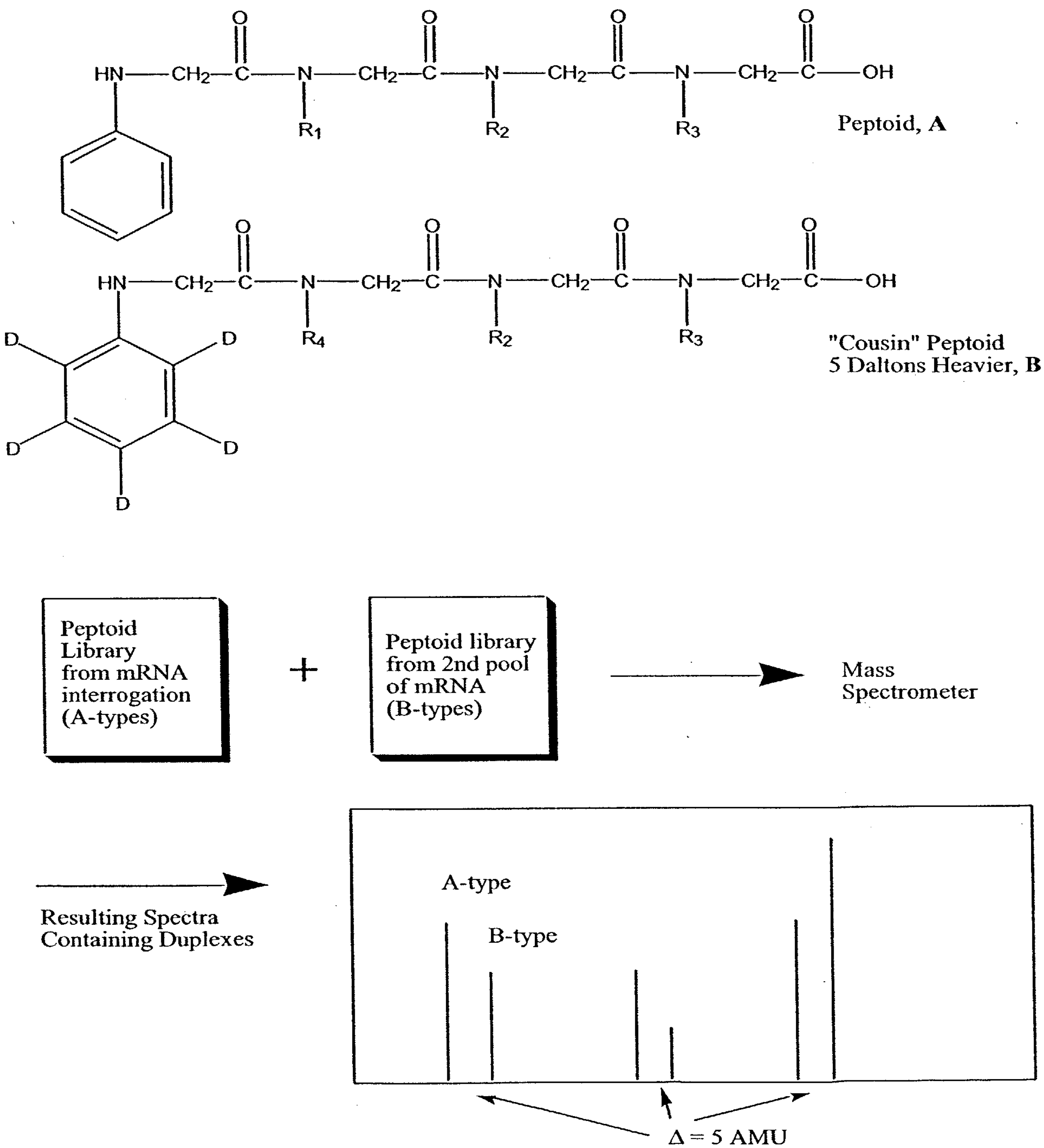

Peptoid Library from mRNA interrogation (A-types)
+
Pre-quantitated "Cousin" Library (B-types)
Mass Spectrometer
Resulting Spectra Containing Duplexes
A-type
B-type
Δ = 5 AMU

FIGURE 16



HN—CH2—C—N—CH2—C—N—CH2—C—N—CH2—C—OH
R1
R2
R3
Peptoid, A
"Cousin" Peptoid
5 Daltons Heavier, B
R4
D
Peptoid Library from mRNA interrogation (A-types)
+
Peptoid library from 2nd pool of mRNA (B-types)
Mass Spectrometer
Resulting Spectra Containing Duplexes
A-type
B-type
Δ = 5 AMU

FIGURE 17

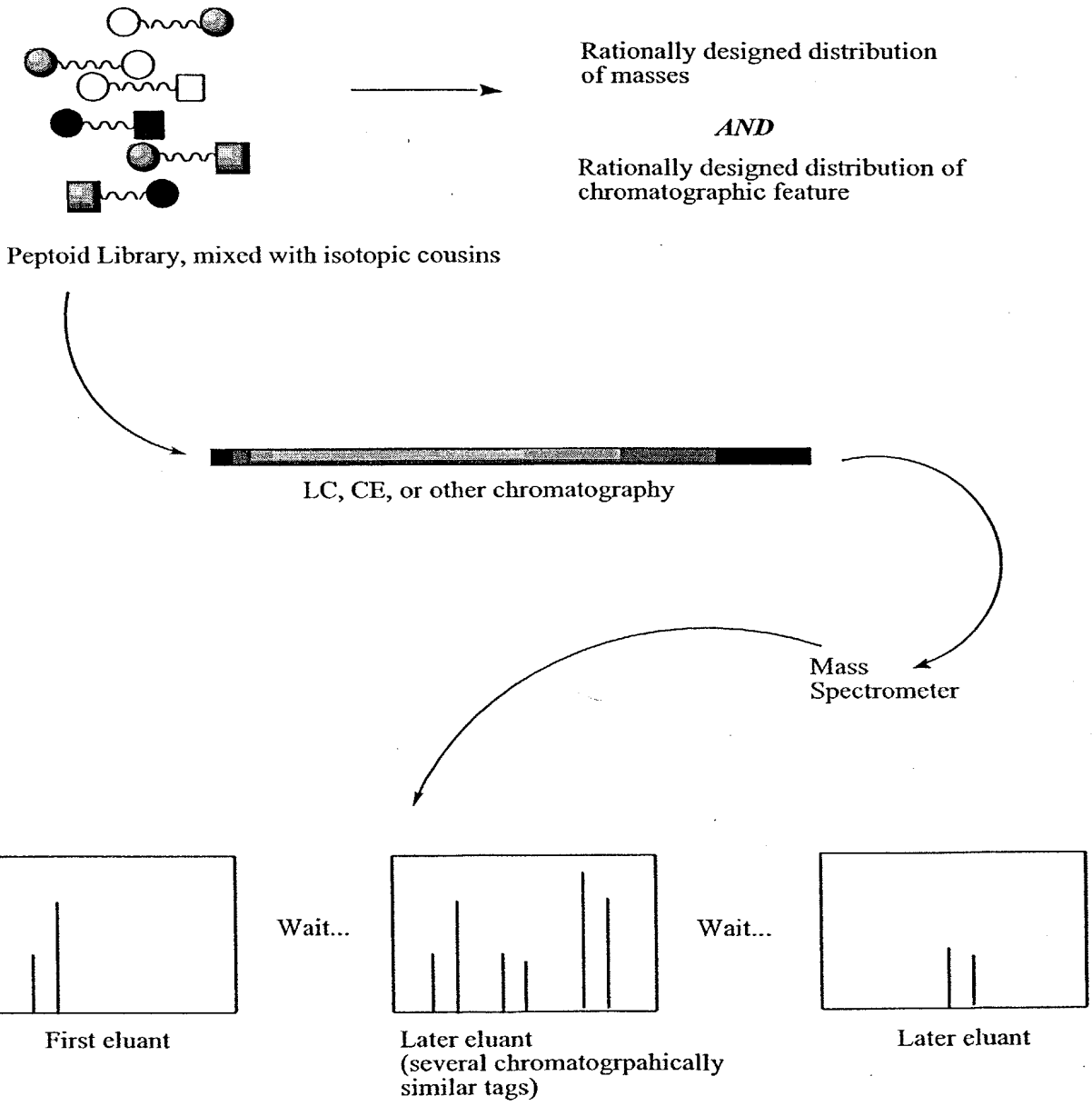
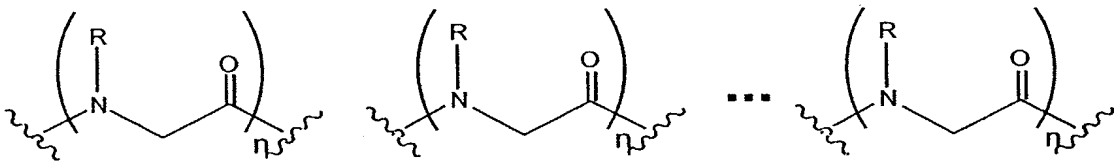

Rationally designed distribution of masses
AND
Rationally designed distribution of chromatographic feature
Peptoid Library, mixed with isotopic cousins
LC, CE, or other chromatography
Mass Spectrometer
Wait...
Wait...
First eluant
Later eluant (several chromatogrpahically similar tags)
Later eluant

FIGURE 18

1) Synthesize and purify 1000 different peptoid oligomer mass tags, of mass 6,000 to 11,000 Daltons.



M=6,000
"pM6000"

M=6,005
"pM6005"

M=11,000
"pM11000"

This will be performed by a robotic synthesizer on solid phase, with oligomer lengths of up to 40 residues. Molecular weights per residue will be 150-300 Daltons.

2) Synthesize and purify 16,000 different DNA oligos, complementary to the mRNA specie to be detected. Create 16 libraries of 1,000 oligos each.

$AA(NNNNNNNN)_1$, $AA(NNNNNNNN)_2$, ..., $AA(NNNNNNNN)_{1,000}$

$AC(NNNNNNNN)_1$, $AC(NNNNNNNN)_2$, ..., $AC(NNNNNNNN)_{1,000}$

.....

$TT(NNNNNNNN)_1$, $TT(NNNNNNNN)_2$, ..., $TT(NNNNNNNN)_{1,000}$

3) Specifically conjugate oligos in each library to a corresponding peptoid mass tag.

$AA(NNNNNNNN)_1$/pM6000, $AA(NNNNNNNN)_2$/pM6005, ..., $AA(NNNNNNNN)_{1,000}$/pM11000

$AC(NNNNNNNN)_1$/pM6000, $AC(NNNNNNNN)_2$/pM6005, ..., $AC(NNNNNNNN)_{1,000}$/pM11000

.....

$TT(NNNNNNNN)_1$/pM6000, $TT(NNNNNNNN)_2$/pM6005, ..., $TT(NNNNNNNN)_{1,000}$/pM11000

4) Purify DNA/peptoid mass tag products and combine library elements into 16 pools.

FIGURE 19

Mass-tagging on a chip:
How to measure levels of 16,000 mRNA species in solution

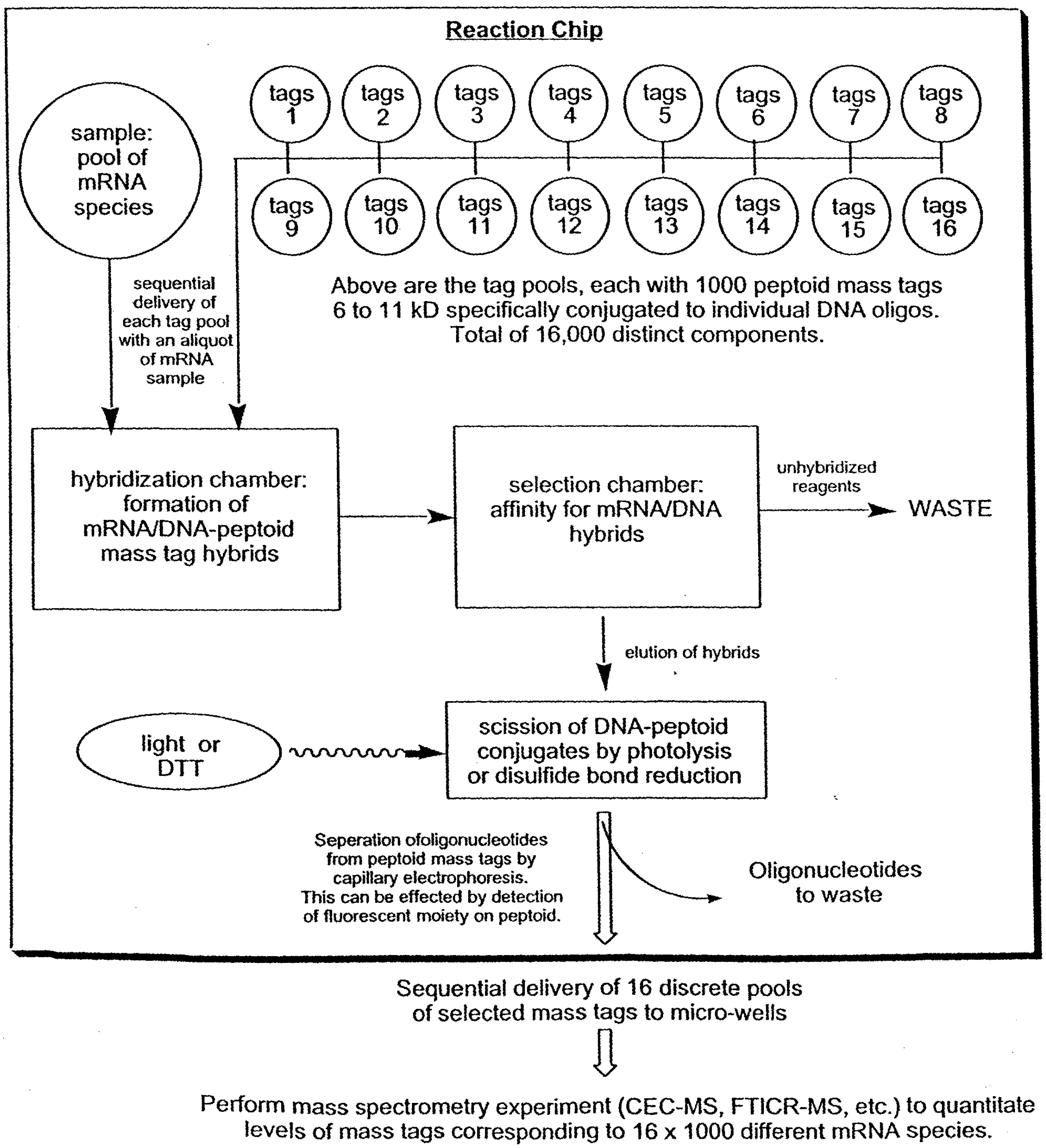
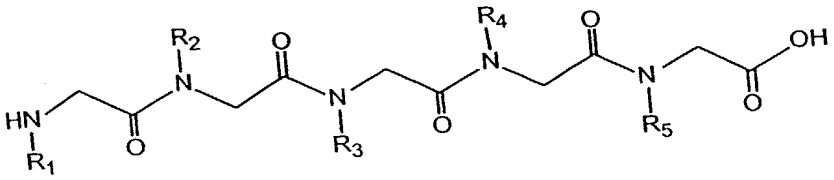
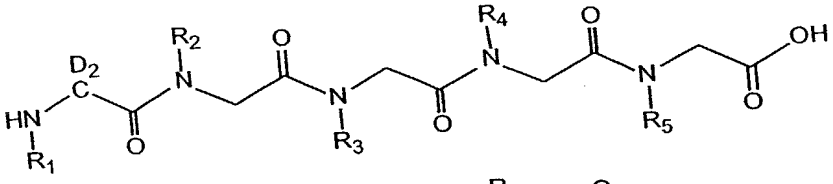


FIGURE 20

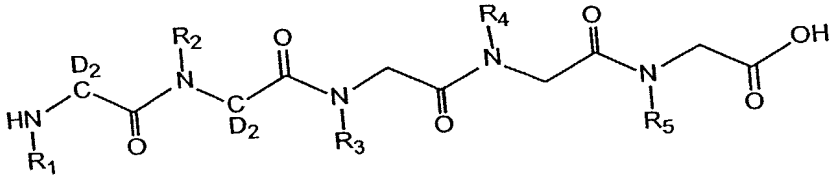
A



B



C



D

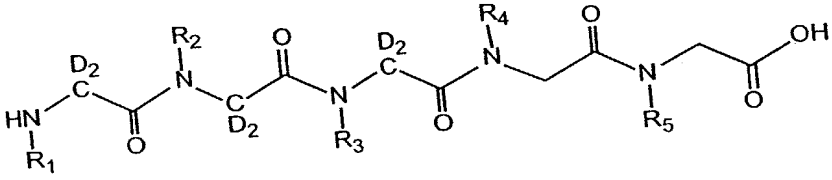


FIGURE 21

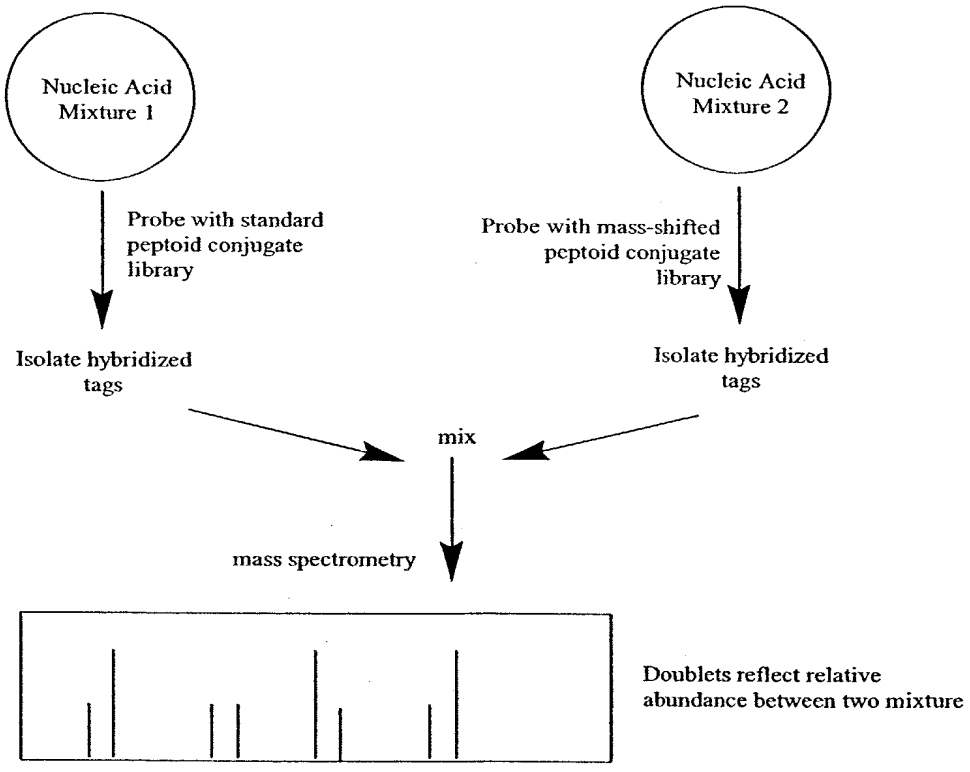


FIGURE 22

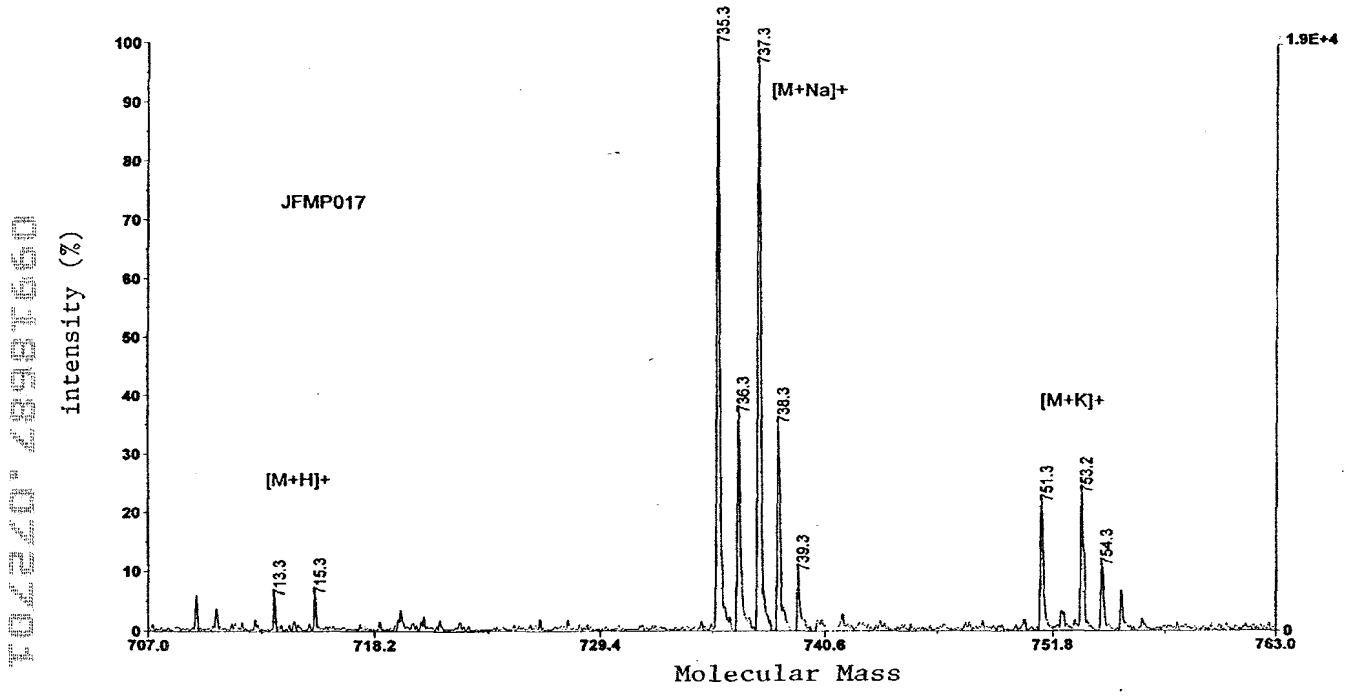

JFMP017
[M+H]+
[M+Na]+
[M+K]+
713.3
715.3
735.3
736.3
737.3
738.3
739.3
751.3
753.2
754.3
1.9E+4
0
intensity (%)
Molecular Mass
707.0
718.2
729.4
740.6
751.8
763.0

FIGURE 23